

# JAPAN

## EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

JIS Z 9124 (1992) (English): Lighting for skiing grounds and ice skating rinks

安

*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

併

BLANK PAGE



BLANK PAGE



# JIS

**JAPANESE INDUSTRIAL STANDARD**

**Lighting for skiing grounds  
and ice skating rinks**

**JIS Z 9124—1992**

**Translated and Published**

**by**

**Japanese Standards Association**

In the event of any doubt arising,  
the original Standard in Japanese is to be final authority.

## JAPANESE INDUSTRIAL STANDARD

J I S

Lighting for skiing grounds  
and ice skating rinks

Z 9124-1992

1. Scope This Japanese Industrial Standard specifies lighting for the following installations for skiing grounds and ice skating rinks.

- (1) Gelände (ski-slope)
- (2) Lang-lauf course (long distance course)
- (3) Schanze for ski jump (ski-jumping slope)
- (4) Rink for ice hockey
- (5) Rink for figure skating
- (6) Rink for speed-skating

Remarks: The following standards are cited in this Standard:

JIS C 1609 Illuminance meters

JIS C 7612 Illuminance measurements for lighting installations

JIS Z 8113 Glossary of lighting terms

2. Definition The following definitions shall be used for the main terms used in this Standard in addition to those specified in JIS Z 8113:

- (1) tracking lighting The lighting that projects the light by a floodlight toward running direction from behind the descending skier as a method for floodlighting in skiing grounds.
- (2) road lighting system One of the lighting systems in the part of approach in a schanze for ski jump in which the luminaires designed to distribute the light in two directions are installed on light pole or wall and are arranged at equal intervals along the approach.
- (3)  $\frac{1}{2}$  illuminance angle The angle made by the downward optical axis and the line made by linking the center of light and the point where the surface illuminance on the horizontal plate becomes  $\frac{1}{2}$  of illuminance of downward optical axis when making the optical axis of reflector vertical.

### 3. Requirements for execution of lighting

3.1 Investigation item The following items shall be investigated when planning the lightings:

- (1) Structure of installation Distinction between outdoor installation and indoor installation, shape and dimension of installation, for the indoor installation kinds of ceiling and wall (structure, materials, color, reflectance, etc.).

Moreover, as far as the ski ground is concerned, average snowfall, slope, location where setting up of pole is possible, etc.

- (2) Contents of utilization Distinction whether for race or for recreation, distinction whether TV-shooting or not.
- (3) Environment of installation For outdoor installation, whether residential area, road, railway, airport, etc. are located in the vicinity and positional relationship between them.
- (4) Weather condition For outdoor installation, conditions of snowfall, damage by salt, strong wind, etc.
- (5) Condition of power source Electrical system, service voltage, frequency, power capacity, etc.

3.2 Design of lighting The following items shall be taken into account at the design of lighting:

- (1) Illuminance and its uniformity Enough illuminance shall be given to the sporting surface and the upper space and good uniformity shall be secured.
- (2) Glare Care shall be taken to decrease the glare reflected directly from the luminaire as far as possible so that no serious trouble occurs in the race or watching.
- (3) Stroboscopic effect When discharge lamp are lit up at a power frequency (50 Hz or 60 Hz), the stroboscopic effect shall be reduced as far as possible.
- (4) Light source Adequate light sources shall be selected taking the following items into consideration:
  - (a) Lamp efficiency (overall efficiency including ballast loss, in the case of discharge lamps).
  - (b) Life and luminous flux maintenance factor.
  - (c) Light source color and color rendering property.
  - (d) Change of characteristic under the circumstance at low temperature.
- (5) Others The following items shall be taken into consideration:
  - (a) Selection of materials for works and methods for works suitable to natural environment.
  - (b) Ease of maintenance and control.
  - (c) Economical efficiency
  - (d) Securing of safe lighting.
  - (e) Securing of spare circuits.

#### 4. Standard of lighting

##### 4.1 Lighting for ski ground

4.1.1 Gelände (outdoor and indoor) and lang-lauf course The lighting installations for Gelände and lang-lauf course shall comply with the following requirements:

- (1) Range of lighting The range of lighting shall be the whole area of light planning in the Gelände and lang-lauf course except the area used for transportation such as lifts.
- (2) Illuminance and uniformity The average value and the uniformity of horizontal illuminance on snow plane shall be the values shown in Table 1.

The measuring method for illuminance shall be as specified in Annex.

Table 1. Average value and uniformity of horizontal illuminance

Division of grounds		Horizontal illuminance	
		Average value lx	Uniformity <sup>(1)</sup>
Gelände	Outdoor	20 min.	0.20 min.
	Indoor	100 min.	
Lang-lauf course		10 min.	0.10 min.

Note <sup>(1)</sup> The uniformity of horizontal illuminance shall be calculated by the formula (1),

$$U_h = \frac{E_{hmin}}{E_{have}} \dots\dots\dots (1)$$

where,  $U_h$ : uniformity of horizontal illuminance

$E_{hmin}$ : minimum value of horizontal illuminance (lx)

$E_{have}$ : average value of horizontal illuminance (lx)

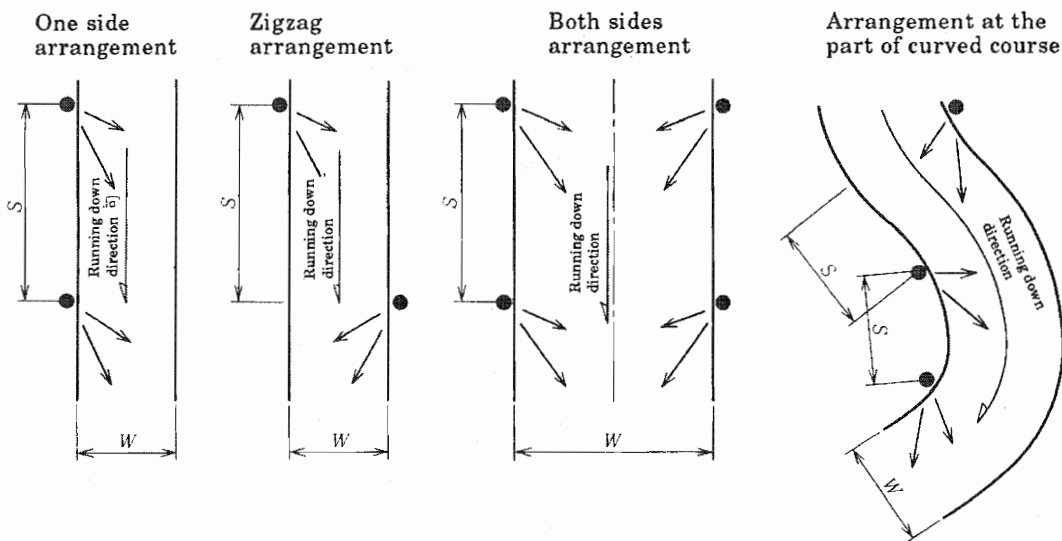
- (3) Lighting system The tracking lighting based on the floodlighting system shall be used, as a rule, in Gelände. In the indoor Gelände, the direct lighting system by means of reflector for lighting may be used.

Lighting system for lang-lauf course is not specified.



- (4) Arrangement of luminaires For the floodlighting system in gelände, one side arrangement, zigzag arrangement, face to face arrangement or the combination of them as shown in Fig. 1 shall be adopted.  
At the part of curved course, it is recommended to arrange on the inside of curve.

Fig. 1. Example of arrangement of luminaires



- Remarks 1. Mark ● indicates the position where the luminaires are installed.  
2. S indicates the interval of installation of luminaires and W indicates the width of light planning.

- (5) Mounting height of luminaire and interval of installation The mounting height of luminaire shall be decided by using the formula (2) for one side arrangement and zigzag arrangement and the formula (3) for both sides arrangement.

The installation interval of luminaires shall be decided by using the formula (4) in any case of arrangement.

The installation interval shall be the distance approximately parallel to the running down direction.

$$H \geq \frac{W}{5} \dots\dots\dots (2)$$

$$H \geq \frac{W}{10} \dots\dots\dots (3)$$

$$S \leq 10H \dots\dots\dots (4)$$

where, H : mounting height of luminaire above snow surface at the lowest position (m)

W : light planning width (m)

S : installation interval of luminaires (m)

- (6) Luminaires The luminaires used for gelände shall be the floodlight and selected in accordance with Table 2.

For the reflector used for indoor gelände is not specified particularly.

Table 2. Selection of luminaires

Number of lamps at one installation location of luminaire	Type of distribution of luminous intensity of floodlight		
	Narrow angle type <sup>(2)</sup>	Medium angle type <sup>(3)</sup>	Wide angle type <sup>(4)</sup>
3 max.	○	○	◎
4 min., 12 max.	○	◎	○
13 min.	◎	○	○

Notes <sup>(2)</sup> This type is that the beam angle (up to  $\frac{1}{10}$  of the maximum luminous intensity) is less than 30°.

<sup>(3)</sup> This type is that the beam angle is 30° or more and less than 60°.

<sup>(4)</sup> This type is that the beam angle is 60° or more.

Remarks: Mark ◎ indicates to be used mainly and mark ○ indicates to be used where appropriate.

4.1.2 Schanze for ski jump The lighting in the schanze for ski jump shall conform to the following standard.

- (1) Range of lighting The range shall include approach, kante, landing slope and stop zone.
- (2) Illuminance and uniformity The average value of illuminance on the snow surface and uniformity of horizontal illuminance shall be the values shown in Table 3.

The measuring method for illuminance shall be in accordance with Annex.

Table 3. Average value of illuminance and uniformity of horizontal illuminance

Area	Horizontal illuminance		Vertical illuminance <sup>(5)</sup>
	Average value lx	Uniformity <sup>(1)</sup>	Average value lx
Approach	50 min.	0.40 min.	50 min.
Kante and landing slope	300 min.	0.40 min.	50 min.
Stop zone	30 min.	0.20 min.	—

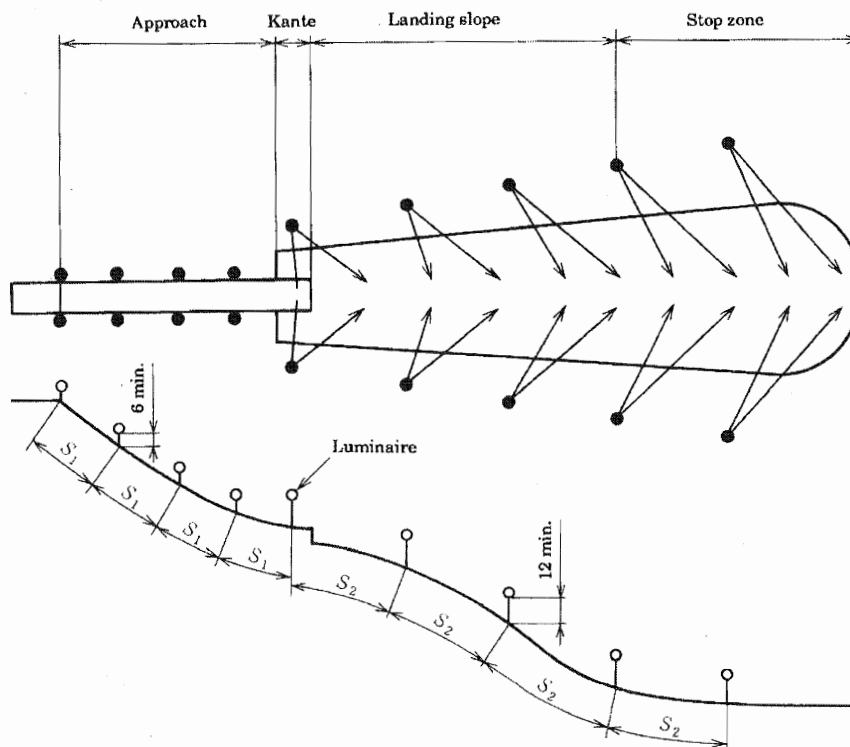
Note <sup>(5)</sup> The vertical illuminance is given as a value in the direction to the judge and spectator at the position of player.

Remarks: For the illuminance and the uniformity for television shooting, see Clause 5.

- (3) Lighting system The lighting system shall be the floodlighting system or road lighting system for the approach and the tracking lighting system by means of the luminaires for kante, landing slope and stop zone.
- (4) Arrangement of luminaires The luminaires shall be arranged on both sides along the ski ground as shown in Fig. 2.

Fig. 2. Example of arrangement of luminaires

Unit: m



Remarks:  $S_1$  indicates the interval of installation of luminaires in approach and  $S_2$  does those of landing slope and stop zone.

- (5) Mounting height and installation interval of luminaires The mounting height of luminaires shall be 6 m or more above snow surface for the approach and 12 m or more above snow surface for the kante, landing slope and stop zone.

Besides, the installation interval of luminaires shall be not more than three times the mounting height.

- (6) Luminaires The luminaire shall be floodlight as a rule and be selected in accordance with Table 4.  
For the approach, the luminaires whose distribution of luminous intensity is controlled in two directions are allowed to be mounted on lighting pole or wall.

Table 4. Selection of luminaires

Area	Type of distribution of luminous intensity of floodlight		
	Narrow angle type <sup>(2)</sup>	Medium angle type <sup>(3)</sup>	Wide angle type <sup>(4)</sup>
Approach and kante	—	○	◎
Landing slope and stop zone	○	◎	—

Remarks: Mark ◎ indicates to be used mainly and mark ○ indicates to be used where appropriate.

#### 4.2 Lighting in rink for ice skating

4.2.1 Outdoor rink for ice hockey and figure skating The lighting in the outdoor rink for ice hockey and figure skating shall conform to the standards specified in the following items:

- (1) Range of lighting The overall rink surrounded by fence shall be included.
- (2) Illuminance and uniformity The average value and the uniformity of horizontal illuminance on ice surface shall be the values shown in Table 5.

The measuring method for illuminance shall be in accordance with Annex.

Table 5. Average value and uniformity of horizontal illuminance

Classification by sports	Horizontal illuminance	
	Average value lx	Uniformity <sup>(1)</sup>
Official race <sup>(6)</sup>	1500 min.	0.65 min.
General race <sup>(7)</sup>	750 min.	0.50 min.
Recreation <sup>(8)</sup>	300 min.	0.30 min.

Notes <sup>(6)</sup> The race, the result of which is retained as the official record.

<sup>(7)</sup> Other race than the official race.

<sup>(8)</sup> The sports for enjoying leisure or for health enhancement.

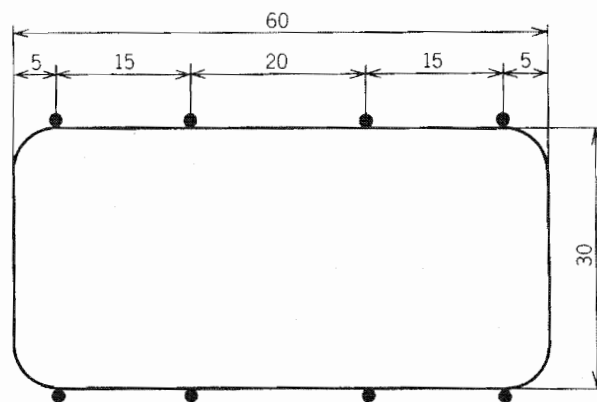
Remarks: As to the illuminance and the uniformity for TV-shooting,  
see Clause 5.

(3) Lighting system This shall be floodlighting system.

(4) Arrangement of luminaires The side arrangement (8 places) shall be adopted as shown in Fig. 3.

Fig. 3. Example of arrangement of luminaires

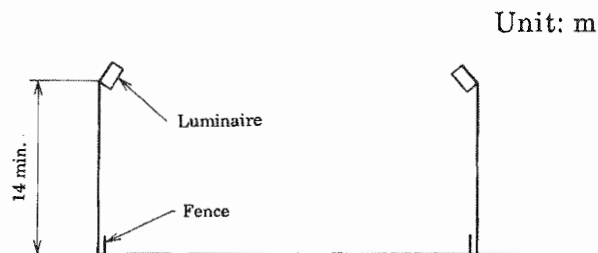
Unit: m



Remarks: Mark ● indicates the location where the luminaires are to be arranged.

- (5) Mounting height of luminaires The mounting height shall be 14 m or more above ice surface as shown in Fig. 4.

Fig. 4. Mounting height of luminaires



- (6) Luminaires The floodlight shall be used and selected in accordance with Table 6.

Table 6. Selection of luminaires

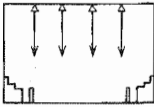
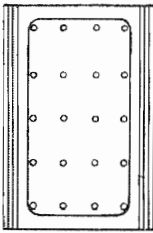
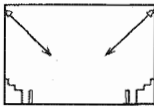
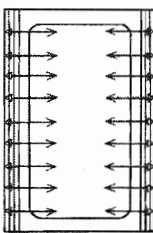
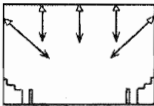
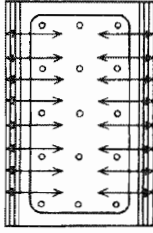
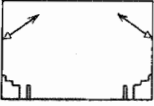
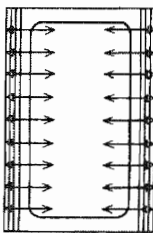
Classification by sports	Type of distribution of luminous intensity of floodlight	
	Medium angle type <sup>(3)</sup>	Wide angle type <sup>(4)</sup>
Official race <sup>(6)</sup>	⊙	○
General race <sup>(7)</sup>	⊙	○
Recreation <sup>(8)</sup>	○	⊙

Remarks: Mark ⊙ indicates to be used mainly and mark ○ indicates to be used where appropriate.

4.2.2 Indoor rink for ice hockey and figure skating The lighting of the indoor rink for ice hockey and figure skating shall conform to the standards specified in the following items:

- (1) Range of lighting The overall rink surrounded by fence shall be included.
- (2) Illuminance and uniformity The average value and the uniformity of horizontal illuminance on ice surface shall be the values shown in Table 5.  
The measuring method for illuminance shall be in accordance with Annex.
- (3) Lighting system The direct lighting system shall be used as a rule. If the ceiling surface is the diffuse reflection surface with high reflectivity, the indirect lighting system is allowed to be used.
- (4) Arrangement of luminaires The arrangement shall be selected from Table 7.

Table 7. Arrangement of luminaires

Lighting system	Arrangement of luminaires		Example of arrangement of luminaires		The indoor rink not intended for TV-shooting.	The indoor rink intended specifically for TV-shooting.
			Sectional drawing	Plan		
Direct lighting system	Diffused arrangement	Luminaires are arranged in a way to be dispersed over the whole ceiling.			◎	○
	Side arrangement	Luminaires are arranged on both sides of skating rink in a linear state.			○	○
	Combined arrangement	The diffused arrangement and the side arrangement are combined.			◎	◎
Indirect lighting system	Side arrangement	The luminaires are arranged in a linear state on both sides of skating rink and project the light in the diagonally upward direction.			○	○

Remarks: Mark ◎ indicates the suitable ones and mark ○ indicates the ones allowed to be used.

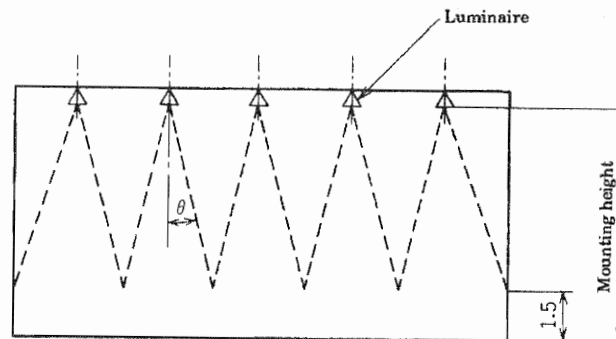
(5) Installation interval and mounting height of luminaires

- (a) The installation interval of luminaires in the diffused arrangement shall be within the range which satisfies  $1/2$  illuminance angle at the horizontal surface 1.5 m above the ice plane as shown in Fig. 5.

The mounting height of luminaires is not specified particularly.

Fig. 5. Installation interval of luminaires in diffused arrangement

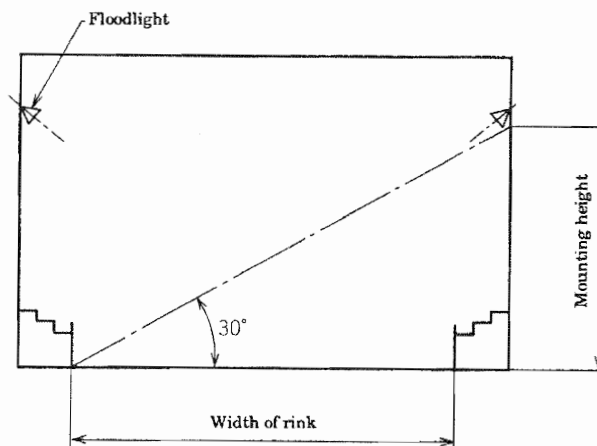
Unit: m



Remarks:  $\theta$  indicates  $1/2$  illuminance angle.

- (b) The mounting height of luminaires in the side arrangement in direct lighting system shall be the position that an angle of elevation of  $30^\circ$  or more from the ice surface at the end of rink as shown in Fig. 6.

Fig. 6. Mounting height of floodlight in side arrangement





- (c) The mounting height of luminaires in side arrangement in indirect lighting system shall be 2.3 m or more above the floor.
- (6) Luminaires The using way shall be selected from Table 8 as to whether the reflector or the floodlight is individually used or collectively used in plural number as a large size installation, according to the arrangement.

Table 8. Selection of luminaires

Lighting system	Arrangement of luminaires		Luminaires		
			Reflector	Floodlight	Large size installation
Direct lighting system	Diffused arrangement		◎	○	◎
	Side arrangement		—	◎	—
	Combined arrangement	Diffused arrangement	◎	○	◎
		Side arrangement	—	◎	—
Indirect lighting system	Side arrangement		○	◎	—

Remarks: Mark ◎ indicates the suitable ones and mark ○ indicates the ones allowed to be used.

4.2.3 Outdoor rink for speed-skating Of the outdoor rink for speed-skating, the lighting for 400 m track shall conform to the standards specified in the following items.

As to the lighting of short-track, the standard specified in 4.2.1 shall be applied.

- (1) Range of lighting Overall running course shall be included.
- (2) Illuminance and uniformity The average value and the uniformity of horizontal illuminance on the ice surface of the course shall be the values shown in Table 9.

The measuring method for illuminance shall be in accordance with Annex.

Table 9. Average value and uniformity of horizontal illuminance

Classification by sports	Horizontal illuminance	
	Average value lx	Uniformity <sup>(1)</sup>
Official race <sup>(6)</sup>	1500 min.	0.50 min.
General race <sup>(7)</sup>	750 min.	0.40 min.
Recreation <sup>(8)</sup>	300 min.	0.25 min.

Remarks: For the illuminance and the uniformity for TV-shooting, see Clause 5.

- (3) Lighting system The floodlighting system shall be used.
- (4) Arrangement of luminaires The side arrangement (eight places) or the all round arrangement shall be adopted.
- (5) Mounting height and installation interval of luminaires
- (a) The mounting height and the installation interval of luminaires in side arrangement shall be decided by using the formula (5) and Fig. 7.

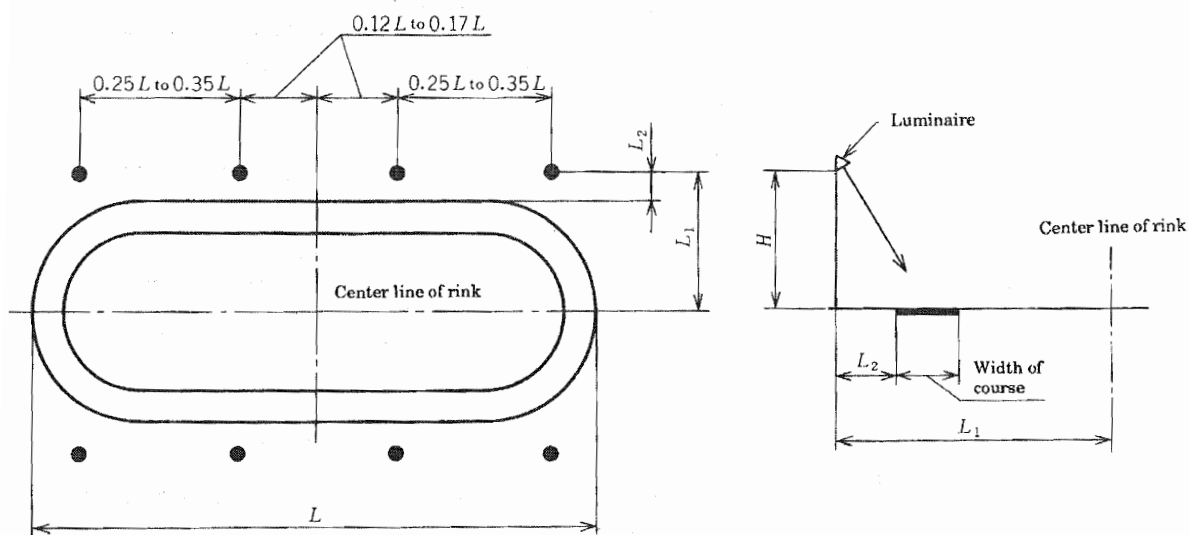
$$\left. \begin{array}{l} 0.35L_1 \leq H \leq 0.65L_1 \\ \text{besides} \\ L_2 \leq H \leq 4L_2 \end{array} \right\} \dots\dots\dots (5)$$

where,  $H$  : mounting height of luminaire at the lowest position (m)

$L_1$  : horizontal distance from the center line of rink to the luminaire at the lowest position (m)

$L_2$  : horizontal distance from the end of rink to the luminaire at the lowest position (m)

Fig. 7. Mounting height and installation interval of luminaires in side arrangement



Remarks: Mark ● indicates the position where the luminaires are installed.

- (b) The mounting height and the installation interval of luminaires in all around arrangement shall be decided by using the formula (6) and Fig. 8.

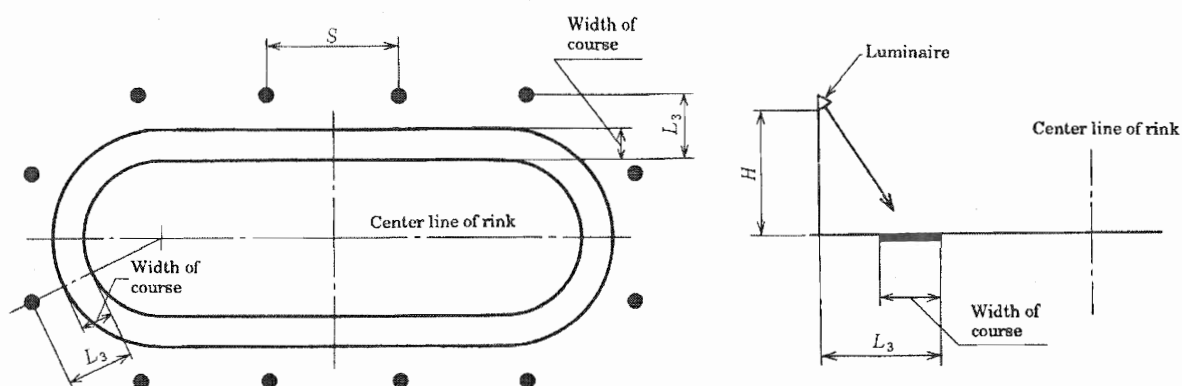
$$\left. \begin{array}{l} H \geq L_3 \\ \text{besides} \\ S \leq 3H \end{array} \right\} \dots\dots\dots (6)$$

where,  $H$  : mounting height of luminaire at lowest position (m)

$L_3$  : horizontal distance from the inside of course width to the luminaire at the lowest position (m)

$S$  : installation interval of luminaires (m)

Fig. 8. Mounting height and installation interval of luminaires in all around arrangement



Remarks: Mark ● indicates the locations where the luminaires are installed.

- (6) Luminaire The floodlight shall be used and selected in accordance with Table 10.

Table 10. Selection of luminaires

Classification by sports	Type of distribution of luminous intensity of floodlight		
	Narrow angle type <sup>(2)</sup>	Medium angle type <sup>(3)</sup>	Wide angle type <sup>(4)</sup>
Public race <sup>(6)</sup>	○	◎	○
General race <sup>(7)</sup>	○	◎	○
Recreation <sup>(8)</sup>	○	○	◎

Remarks: Mark ◎ indicates to be used mainly and mark ○ indicates to be used where appropriate.

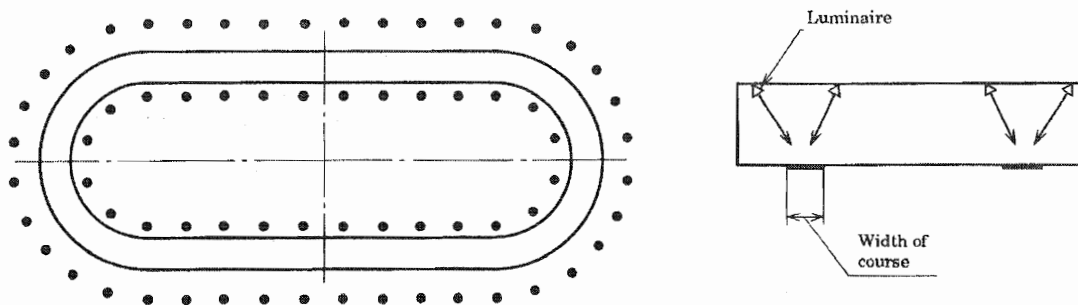
4.2.4 Indoor rink for speed-skating Of the indoor rink for speed-skating, the lighting for 400 m track shall conform to the standards specified in the following items.

To the lighting for short track, 4.2.2 applies.

- (1) Range of lighting Overall running course shall be included.
- (2) Illuminance and uniformity The average value and the uniformity of horizontal illuminance on the ice surface of the course shall be the values shown in Table 9.  
The measurement method for illuminance shall be in accordance with Annex.

- (3) Lighting system The floodlighting system shall be used.
- (4) Arrangement of luminaires The luminaires shall be arranged along the running course as shown in Fig. 9.

Fig. 9. Example of arrangement of luminaires



Remarks: Mark ● indicates the locations where the luminaires are arranged.

- (5) Mounting height and installation interval of luminaires There is no specification.
- (6) Luminaire The floodlightings shall be used and selected in accordance with Table 11.

Table 11. Selection of luminaires

Classification by sports	Type of distribution of luminous intensity of floodlight		
	Narrow angle type <sup>(2)</sup>	Medium angle type <sup>(3)</sup>	Wide angle type <sup>(4)</sup>
Official race <sup>(6)</sup>	○	○	◎
General race <sup>(7)</sup>	○	○	◎
Recreation <sup>(8)</sup>	○	○	◎

Remarks: Mark ◎ indicates to be used mainly and mark ○ indicates to be used where appropriate.

5. Standard of lighting for TV-shooting The lighting for the ski jump schanze and the rink for ice skating intended to take picture for television shall conform to the following items:

- (1) Illuminance and uniformity The illuminance and the uniformity shall be the values shown in Table 12.

The measurement method for illuminance shall be in accordance with Annex.

Table 12. Average value and uniformity of illuminance

Kind of illuminance	Average value lx	Uniformity <sup>(11)</sup>
Vertical illuminance <sup>(9)</sup>	1000 min.	0.30 min.
Horizontal illuminance <sup>(10)</sup>	1000 min.	0.50 min.

Notes <sup>(9)</sup> It means the vertical illuminance toward the side where camera is set and that at the position of 1.5 m above the snow surface in the cases of approach, kante and stop zone, and the space up to 10 m over the snow surface in the case of landing slope and the position of 1.5 m high above the ice surface in the case of the rink for ice skating.

<sup>(10)</sup> It shall be the horizontal illuminance on the snow surface in the schanze for ski jump and on the ice surface in the case of the rink for ice skating.

<sup>(11)</sup> The uniformity shall be in accordance with the formulas (7) and (8).

Uniformity of vertical illuminance 
$$U_v = \frac{E_{vmin}}{E_{vmax}} \dots\dots\dots (7)$$

where,  $U_v$  : uniformity of vertical illuminance  
 $E_{vmin}$  : minimum value of vertical illuminance (lx)  
 $E_{vmax}$  : maximum value of vertical illuminance (lx)

Uniformity of horizontal illuminance 
$$U_h = \frac{E_{hmin}}{E_{hmax}} \dots\dots\dots (8)$$

where,  $U_h$  : uniformity of horizontal illuminance  
 $E_{hmin}$  : minimum value of horizontal illuminance (lx)  
 $E_{hmax}$  : maximum value of horizontal illuminance (lx)

Informative reference: Lighting for spectator's seats: The vertical illuminance of spectator's seats toward the side where a camera is set in the rink for ice skating is desirable to secure to the extent as much as 0.25 times the vertical illuminance on the ice surface.

- (2) Reduction of flicker When using discharge lamps, the measure to connect with three phase power source shall be taken in order to reduce the flicker which appears on the image plane of television.
- (3) Illuminant color and color rendering properties The illuminant color and the color rendering properties shall be the values shown in Table 13.

Table 13. Illuminant color and color rendering properties

Illuminant color	Within the range of color temperature of 6000 to 3000 K
Color rendering properties	Color rendering index of 55 or more

6. Maintenance and management For the maintenance and management of lighting installation, the following work shall be carried out periodically:

- (1) Check on operating condition
- (2) Replacement of lamps
- (3) Replacement of ballast (only for separate type)
- (4) Cleaning
- (5) Check on luminaires
- (6) Check on and repair of lighting poles
- (7) Check on and repair of wiring and switching devices
- (8) Measurement and record of illuminance (according to Annex)

## Annex. Measuring method for illuminance

1. Scope This Annex specifies the measuring methods for the horizontal illuminance and the vertical illuminance at the places described below. The general rule for measurement of illuminance other than those specified in this Annex shall be in accordance with JIS C 7612.

The illuminance meter to be used shall be of Class AA specified in JIS C 1609 or that equivalent or superior thereto in performance.

- (1) Gelände in skiing ground, lang-lauf course and schanze for ski jump.
- (2) Rink for ice hockey, rink for figureskating and rink for speed-skating in ice skating grounds.

### 2. Measuring methods for illuminance

2.1 Measurement region The measurement region of illuminance shall be those shown in the following:

- (1) In the gelände and the lang-lauf course, one section of installation interval of luminaires.
- (2) In the schanze for ski jump, approach, kante, landing slope and stop zone.
- (3) In the rink for ice hockey and the rink for figureskating, overall rink.
- (4) In the short track for speed-skating, overall rink and in the 400 m track, whole region of running course.

2.2 Measurement points The measurement points shall be as shown in the Annex Figures 1 to 5.

2.3 Measurement of horizontal illuminance The horizontal illuminance at the point of the height of 15 cm or less on the snow surface or ice surface at the measurement points shown in 2.2 shall be measured.

2.4 Measurement of vertical illuminance The vertical illuminance at the point 1.5 m high on the snow surface or the ice surface at the measurement points shown in 2.2 shall be measured. The measurement direction of vertical illuminance shall be four directions shown in Annex Fig. 6.

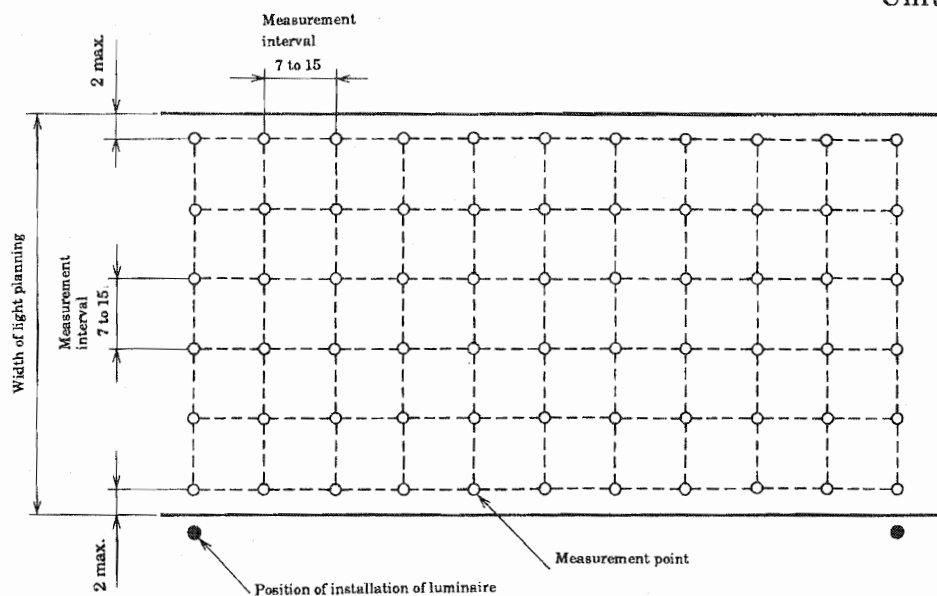
The measuring method for vertical illuminance in the space where the movement in space is acted on the schanze for ski jump is not specified.

- Remarks
1. In the case where the lighting installations and the measurement regions are symmetrical with regard to the center line, the measurement is conducted on one side of symmetry and may be omitted on the other side.
  2. When making the reference for maintenance and management, it is allowed to measure the representative illuminance at several points to judge the transition of illuminance as a whole.



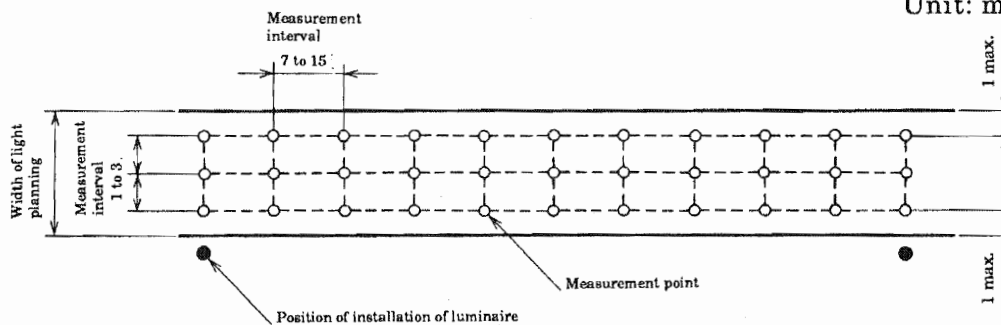
Annex Fig. 1. Measurement points of illuminance in galände

Unit: m

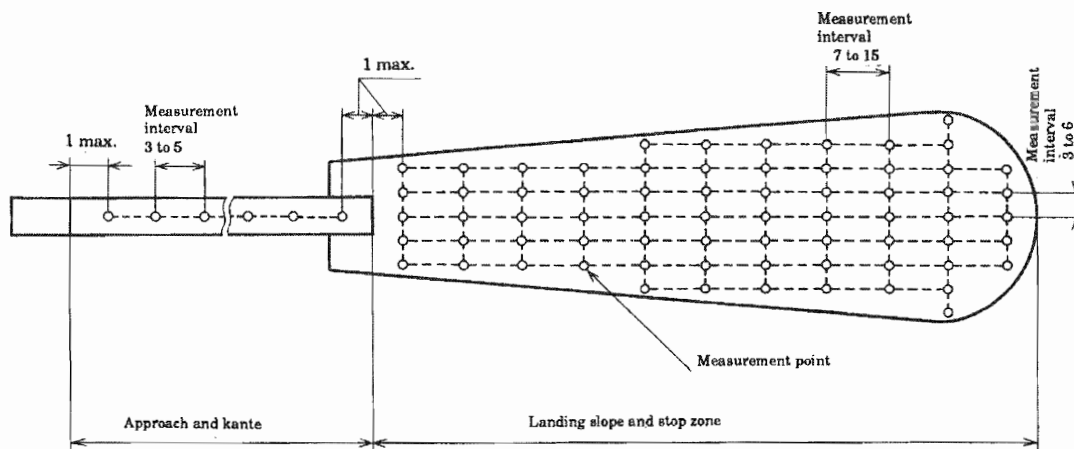


Annex Fig. 2. Measurement points of illuminance on lang-lauf course

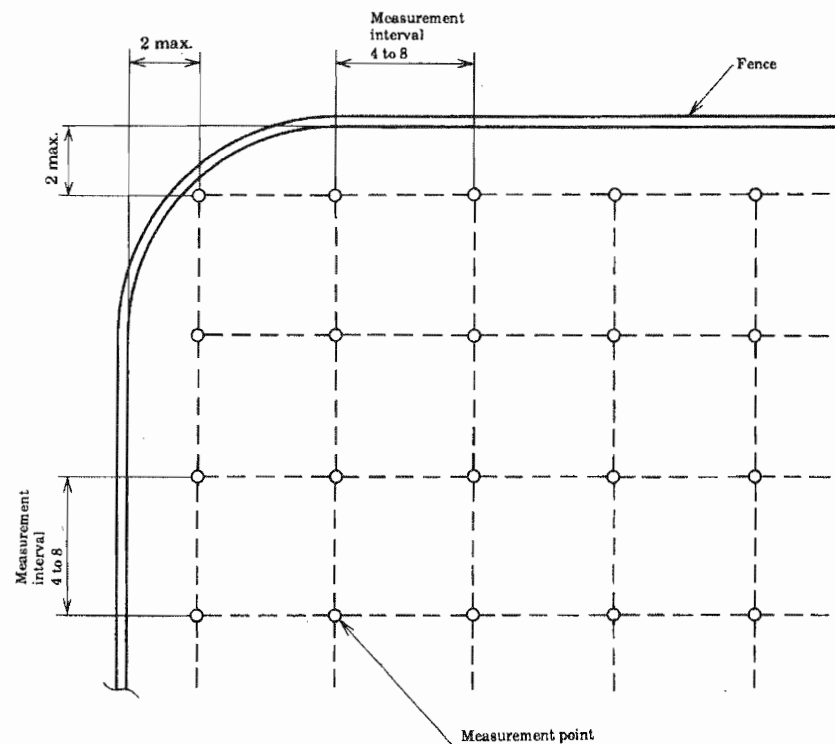
Unit: m



Annex Fig. 3. Measurement points of illuminance in schanze for ski jump  
Unit: m

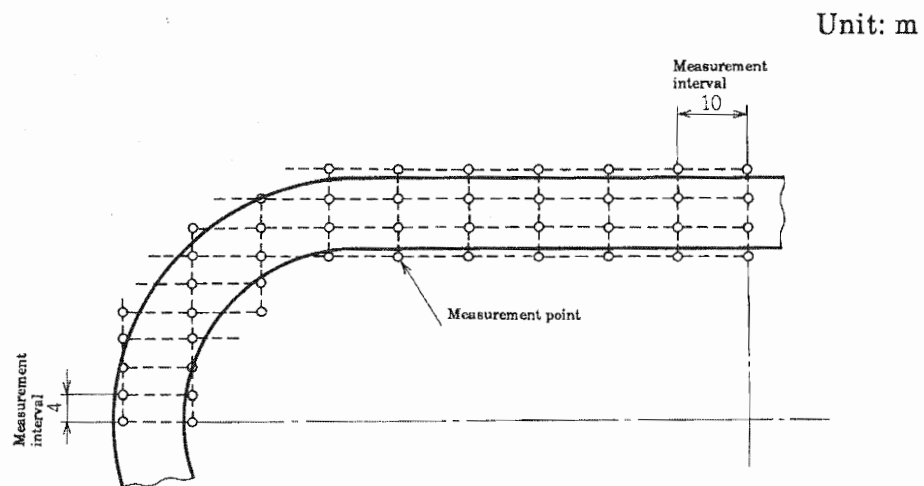


Annex Fig. 4. Measurement points in rink for ice hockey, and rink for figure skating  
Unit: m

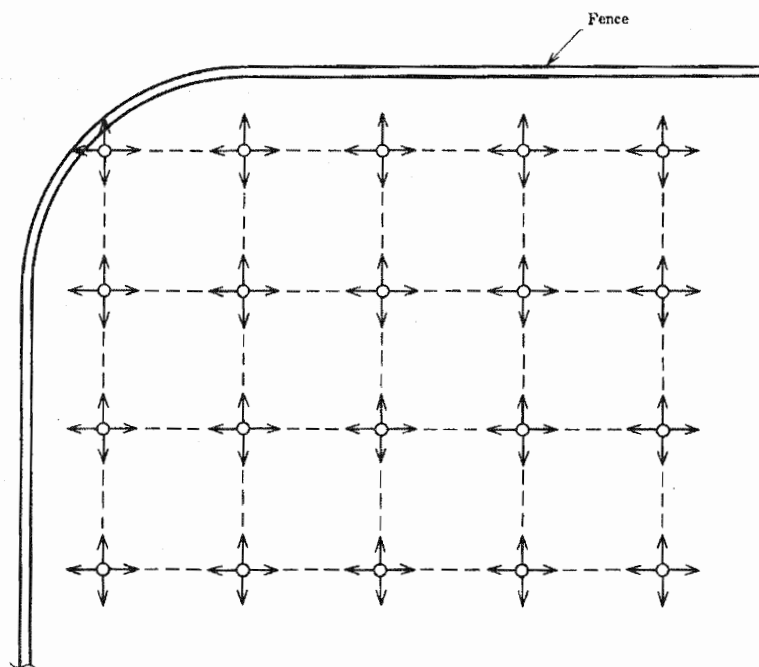




Annex Fig. 5. Measurement points of illuminance on 400 m track for speed-skating



Annex Fig. 6. Measuring method for vertical illuminance



Remarks: Mark → indicates the direction of light receiver of illuminance meter at the measurement points.

Z 9124-1992  
Edition 1

---

Japanese Text

Established by Minister of International Trade and Industry

Date of Establishment: 1992-11-01

Date of Public Notice in Official Gazette: 1992-11-10

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Electricity

---

This English translation is published by:  
Japanese Standards Association  
1-24, Akasaka 4, Minato-ku,  
Tokyo 107 Japan  
© JSA, 1993

Printed in Tokyo by  
Hohbunsha Co., Ltd.